CLAIMS

What is claimed is:

1. A computer-implemented apparatus for use by a plurality of users using a plurality of user devices, the apparatus comprising a plurality of agents of a plurality of different types to communicate with each other, at least some of the agents representing physical entities, each agent having one or more properties and having the ability to subscribe to properties of other agents of the plurality of agents, the plurality of agents including one or more agents to collect information about properties of other agents and to publish the collected information to one or more subscribing agents.

2. A computer-implemented apparatus as recited in claim 1, wherein the plurality of agents comprises a plurality of device agents, each representing one of the plurality of user devices.

3. A computer-implemented apparatus as recited in claim 1, wherein the plurality of agents comprises a plurality of persona agents, each representing one of the plurality of users.

4. A computer-implemented apparatus as recited in claim 1, wherein the plurality of agents comprises:

a plurality of device agents, each representing one of the plurality of user devices; and

a plurality of persona agents, each representing one of the plurality of users.

5. A computer-implemented apparatus as recited in claim 4, wherein the plurality of persona agents collect information about the properties of other agents, including the

device agents, and route the collected information to one or more other agents which subscribe to the properties.

6. A computer-implemented apparatus as recited in claim 4, wherein the device agents communicate with each other through one or more of the persona agents.

7. A computer-implemented apparatus as recited in claim 4, wherein each of the plurality of agents has a set of properties to maintain state information.

8. A computer-implemented apparatus as recited in claim 7, wherein the plurality of user devices comprises a wireless device, the wireless device comprising an embedded client application configured to receive and interpret extensible markup language data representing changes to said state information.

9. A computer-implemented apparatus as recited in claim 4, wherein at least one of the device agents represents a wireless user device that has an intermittent connection to the other user devices, wherein said device agent has a set of subscriptions and maintains state information for the set of subscriptions, and wherein said device agent communicates with a corresponding one of the persona agents to update said state information.

10. A computer-implemented apparatus as recited in claim 9, wherein said corresponding one of the persona agents automatically publishes to said device agent state information to which the device agent has subscribed, when the user device represented by said device agent establishes the connection.

11. A computer-implemented apparatus as recited in claim 4, wherein the plurality of agents use a data synchronization process to update state information.

10. A computer-implemented apparatus as recited in claim 9, wherein the state information comprises device presence or location information.

12. A computer-implemented apparatus as recited in claim 11, wherein at least some of the agents cache state information received from another agent.

13. A computer-implemented apparatus as recited in claim 1, wherein the plurality of agents comprises a chat agent to represent a chat session.

14. A computer-implemented apparatus as recited in claim 1, wherein the plurality of user devices comprises a computer coupled to a wireline network and a mobile device operating on a wireless network, the computer and the mobile device each represented by a separate one of the agents.

15. A computer-implemented apparatus as recited in claim 1, wherein the agents communicate with each other using an extensible data interchange protocol.

16. A computer-implemented apparatus as recited in claim 15, wherein the agents communicate with each other using an extensible markup language (XML) based protocol.

17. A computer-implemented apparatus as recited in claim 1, wherein a change to a property of one of the agents is automatically published to an agent which has subscribed to the property of said one of the agents.

18. A computer-implemented apparatus as recited in claim 1, wherein at least some of the agents can set properties of other ones of the agents.

19. A computer-implemented apparatus as recited in claim 1, wherein for at least one of the agents, a user associated with said agent can control which agents may subscribe to properties of said agent.

20. A computer-implemented apparatus as recited in claim 1, wherein for at least one of the agents, a user associated with said agent can specify the properties of said agent to which other agents may subscribe.

21. A computer-implemented apparatus as recited in claim 20, wherein the user associated with said agent can specify the properties of said agent to which other agents may subscribe on a per-subscriber basis.

22. A computer-implemented apparatus as recited in claim 1, wherein the plurality of agents further comprises an interoperability agent to connect the messaging system with another messaging system.

23. A computer-implemented apparatus as recited in claim 22, wherein the interoperability agent converts between an extensible data interchange protocol used by the plurality of agents and another protocol used by said other messaging system.

24. A computer-implemented apparatus as recited in claim 1, wherein the apparatus embodies a messaging application.

25. A computer-implemented apparatus as recited in claim 24, wherein the messaging application comprises a user-to-user messaging application.

26. A computer-implemented apparatus as recited in claim 25, wherein the user-to-user messaging application is an Instant Messaging (IM) application.

27. A computer-implemented apparatus as recited in claim 1, wherein the apparatus embodies a content distribution application.

28. A computer-implemented apparatus as recited in claim 1, wherein the apparatus embodies a game application.

29. A computer-implemented apparatus as recited in claim 1, wherein the apparatus embodies a user collaboration application.

30. A computer-implemented apparatus as recited in claim 1, wherein the apparatus embodies a call setup application.

31. A computer-implemented apparatus as recited in claim 1, wherein the apparatus embodies a provisioning application.

32. A computer-implemented apparatus as recited in claim 1, wherein the apparatus embodies an alerting/notification application.

33. A machine-readable storage medium storing instructions which embody an application for execution by a processing system, the application for use by a plurality of users using a plurality of user devices, such that the application, when executed, generates a plurality of agents of a plurality of different types to communicate with each other, at least some of the agents representing physical entities, each agent having one or more properties and having the ability to subscribe to properties of other agents of the plurality of agents, the plurality of agents including one or more agents to collect

information about properties of other agents and publish the collected information to one or more subscribing agents.

34. An apparatus comprising:

means for creating a plurality of agents to communicate messages for a plurality of users by using a data synchronization model, the plurality of agents including a plurality of device agents, one for each of a plurality of user devices used by the plurality of users, and a plurality of persona agents, one for each of the users, each agent having one or more properties and having the ability to subscribe to properties of other agents of the plurality of agents; and

means for using the persona agents to collect information about the properties of other agents, including the device agents, and publish the collected information to one or more other agents which subscribe to the corresponding properties.

35. A user-to-user messaging system comprising:

a processor; and

a storage facility coupled to the processor and storing code which configures the processor to create a plurality of agents to communicate user-to-user messages between a plurality of users in real time by using a data synchronization model, each agent having one or more properties and having the ability to subscribe to properties of other agents of the plurality of agents, the plurality of agents including

a plurality of device agents, one for each of a plurality of user devices used by the plurality of users;

a plurality of persona agents, one for each of the users, to collect information about the properties of other agents, including the device agents, and publish the collected information to one or more other agents which subscribe to the corresponding properties.

36. A messaging system comprising:

a plurality of agents to communicate messages between a plurality of users in real time by using an extensible data interchange protocol to implement a document synchronization model, each agent having one or more properties and having the ability to subscribe to properties of other agents of the plurality of agents, wherein the plurality of agents communicate using said extensible data interchange protocol, the plurality of agents including

a plurality of device agents, one for each of a plurality of user devices used by the plurality of users, the plurality of user devices including a computer coupled to a wireline network and a mobile device operating on a wireless network; and

a plurality of persona agents, one persona agent for each of the users, each of the persona agents to collect information about the properties of other agents, including the device agents, and to publish the collected information to one or more other agents which subscribe to the corresponding properties, wherein each of the persona agents comprises a set of properties to maintain state information for each of the user devices used by the user associated with said persona agent, the state information including device presence information, such that a change to a property of one of the agents is automatically published to an agent which has subscribed to the property of said one of the agents.

37. A user-to-user messaging system comprising:

a chat agent to represent a user-to-user messaging session;

a plurality of agents to communicate messages between a plurality of users in real time by using an extensible markup language (XML) document synchronization model, each of the agents having one or more properties defined in XML and having the ability to subscribe to properties of other agents of the plurality of agents, wherein

the plurality of agents communicate with each other using an XML based messaging protocol, the plurality of agents including

a plurality of device agents, one for each of a plurality of user devices used by the plurality of users, the plurality of user devices including a computer coupled to a wireline network and a mobile device operating on a wireless network; and

a plurality of persona agents residing in an agent system coupled to the wireless network and to the wireline network, one persona agent for each of the users, to collect information about the properties of other agents, including the device agents, and to publish the collected information to one or more other agents which subscribe to the properties, wherein each of the persona agents comprises a set of properties to maintain state information for each user device used by the user associated with said persona agent.

38. A method comprising:

creating a plurality of agents of a plurality of different types to communicate with each other, at least some of the agents representing physical entities, each agent having one or more properties and having the ability to subscribe to properties of other agents of the plurality of agents; and

using one or more of the agents to collect information about properties of other agents and to publish the collected information to one or more subscribing agents.

39. A method comprising:

maintaining a messaging application configured to communicate messages between a plurality of users in real-time by using a data synchronization process; and

executing the messaging application to communicate messages between the plurality of users in real-time by using the data synchronization process.

40. A method comprising:

using an extensible markup language schema to provide a user-to-user messaging application, such that the user-to-user messaging application includes a plurality of agents capable of subscribing to properties of each other; and

executing the instant messaging application to allow communication of user-to-user instant messages.

41. A method as recited in claim 40, wherein the agents communicate with each other by communicating extensible markup language (XML) fragments that represent changes to an XML document.

42. A method comprising:

creating a plurality of agents to communicate messages for a plurality of users by using a data synchronization model, the plurality of agents including a plurality of device agents, one for each of a plurality of user devices used by the plurality of users, and a plurality of persona agents, one for each of the users, each agent having one or more properties and having the ability to subscribe to properties of other agents of the plurality of agents; and

using the persona agents to collect information about the properties of other agents, including the device agents, and to publish the collected information to one or more other agents which subscribe to the corresponding properties.

43. An apparatus comprising:

a plurality of sources, each having at least one property;

a plurality of sinks, each capable of subscribing to a property of a source; and

an intermediary agent to aggregate state information corresponding to the properties of the sources and to distribute the state information to sinks, of the set of sinks, which subscribe to the respective properties.